

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A method of performing data detection in a wireless communication system, comprising:
  - deriving log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;
  - computing a decoded base stream based on the derived LLRs for code bits of the first data stream;
  - estimating interference due to the first data stream based on the decoded base stream;
  - [[and]]
    - deriving enhancement LLRs enhancing the decoded base stream by subtracting the estimated interference due to the first data stream from the LLRs for the code bits of the first data stream to form a second data stream configured to augment the LLRs for the code bits of the first data stream and augment the decoded base stream; and
    - computing a decoded enhancement stream based on the enhancement LLRs.
2. (Original) The method of claim 1, further comprising:
  - decoding the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream; and
  - re-encoding and remodulating the decoded data to obtain remodulated symbols for the first data stream, wherein the interference due to the first data stream is estimated based on the remodulated symbols.
3. (Original) The method of claim 1, wherein the LLRs for the code bits of the first data stream are derived from the received symbols in real-time without buffering the received symbols.
4. (Currently Amended) The method of claim 1, further comprising:

storing the LLRs for the code bits of the first data stream in a buffer; and  
storing the enhancement LLRs ~~for the code bits of the second data stream~~ in the buffer by  
overwriting the LLRs for the code bits of the first data stream.

5. (Currently Amended) The method of claim 1, wherein quadrature phase shift keying (QPSK) is used for both the first and ~~second~~ decoded enhancement data streams.

6. (Currently Amended) The method of claim 1, wherein a modulation scheme with a higher order than quadrature phase shift keying (QPSK) is used for the first data stream, the method further comprising:

deriving received symbol estimates based on the LLRs for the code bits of the first data stream, and wherein enhancement LLRs ~~for code bits of the second data stream~~ are derived based on the received symbol estimates and the estimated interference.

7. (Original) The method of claim 6, wherein the deriving received symbol estimates includes:

forming two equations for each received symbol based on LLRs for all code bits of a data symbol carried in the received symbol for the first data stream, and wherein a received symbol estimate for the received symbol is derived from the two equations.

8. (Currently Amended) The method of claim 1, wherein LLRs for code bits of the first and ~~second data streams~~ stream and enhancement LLRs are derived based on a dual-max approximation.

9. (Currently Amended) The method of claim 1, further comprising:

deriving channel gain estimates for a wireless channel used for the data transmission, and wherein LLRs for code bits of the first ~~and second~~ data stream, enhancement LLRs ~~streams~~ and the interference due to the first data stream are derived with the channel gain estimates.

10. (Currently Amended) The method of claim 1, wherein the first data stream is a base stream and the ~~second~~ decoded enhancement data stream is an enhancement stream for a hierarchical coded data transmission.
11. (Original) The method of claim 1, wherein the wireless communication system utilizes orthogonal frequency division multiplexing (OFDM), and wherein the received symbols are from a plurality of subbands.
12. (Currently Amended) An apparatus for a wireless communication system, comprising:  
a first computation unit operative to derive log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;  
modules configured to compute a decoded base stream based on ~~derived~~ the LLRs for code bits of the first data stream received from the first computation unit;  
an interference estimator operative to estimate interference due to the first data stream based on the decoded base stream; ~~[[and]]~~  
a second computation unit operative to derive enhancement LLRs ~~for code bits of a second data stream~~ by subtracting the estimated interference due to the first data stream from the LLRs for the code bits of the first data stream, ~~wherein the second data stream is combined with the first data stream and provided to the modules to enhance the decoded data stream to form an enhanced decoded data stream; and~~  
modules configured to compute a decoded enhancement stream based on the enhancement LLRs.
13. (Original) The apparatus of claim 12, further comprising:  
a decoder operative to decode the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream; and  
an encoder and modulator operative to re-encode and remodulate the decoded data to obtain remodulated symbols for the first data stream, and wherein the interference estimator is operative to estimate the interference due to the first data stream based on the remodulated symbols.
14. (Currently Amended) The apparatus of claim 12, further comprising:

a buffer operative to store the LLRs for the code bits of the first data stream and to store the enhancement LLRs ~~for the code bits of the second data stream~~ by overwriting the LLRs for the code bits of the first data stream.

15. (Currently Amended) The apparatus of claim 12, further comprising:

a channel estimator operative to derive channel gain estimates for a wireless channel used for the data transmission, and wherein the LLRs for the code bits of the first ~~and second data streams~~ stream, the enhancement LLRs and the interference due to the first data stream are derived with the channel gain estimates.

16. (Currently Amended) An apparatus for a wireless communication system, comprising;  
means for deriving log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;

means for computing a decoded base stream based on ~~derived~~ the LLRs for code bits of the first data stream received from the LLR deriving means;

means for estimating interference due to the first data stream based on the decoded base stream;

means for deriving enhancement LLRs by subtracting the estimated interference due to the first data stream from the LLRs for the code bits of the first data stream; and

~~means for enhancing the decoded base stream by subtracting the estimated interference from the LLRs for the code bits of the first data stream to form a second data stream configured to augment the LLRs for the code bits of the first data stream to form an enhanced decoded stream~~

means for computing a decoded enhancement stream based on the enhancement LLRs.

17. (Original) The apparatus of claim 16, further comprising:

means for decoding the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream; and means for re-encoding and remodulating the decoded data to obtain remodulated symbols for the first data stream, wherein the interference due to the first data stream is estimated based on the remodulated symbols.

18. (Original) The apparatus of claim 16, wherein the LLRs for the code bits of the first data stream are derived from the received symbols in real-time without buffering the received symbols.
19. (Currently Amended) The apparatus of claim 16, further comprising:  
means for storing LLRs for the code bits of the first and second data stream and enhancement LLRs streams, wherein enhancement LLRs for code bits of the second data stream are stored by overwriting the LLRs for the code bits of the first data stream.
20. (Currently Amended) A method of performing data detection in a wireless communication system, comprising[[:]]:  
deriving log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;  
deriving uncoded data symbol estimates for the first data stream based on the received symbols or the LLRs for the code bits of the first data stream;  
computing a decoded stream based on at least one of the received symbols and the LLRs for the code bits of the first data stream using a set of modules;  
estimating interference due to the first data stream based on the uncoded data symbol estimates; and  
deriving LLRs for code bits of a second data stream based on the received symbols and the estimated interference;  
wherein the second data stream is provided to the modules to produce an enhanced decoded data stream.
21. (Previously Presented) The method of claim 20, wherein the uncoded data symbol estimates are derived by making hard decisions on either the received symbols or the LLRs for the code bits of the first data stream.
22. (Currently Amended) A method of performing data detection in a wireless communication system, comprising:  
deriving log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;

deriving data symbol estimates for the first data stream based on either the received symbols or the LLRs for the code bits of the first data stream;  
estimating interference due to the first data stream based on the data symbol estimates;  
deriving LLRs for code bits of a second data stream based on the received symbols and the estimated interference;  
decoding the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream;  
re-encoding and remodulating the decoded data to obtain remodulated symbols for the first data stream; and  
adjusting the LLRs for the code bits of the second data stream based on the remodulated symbols and the data symbol estimates for the first data stream;  
wherein the second data stream is based on the data symbol estimates and the second data stream is ~~provided~~ combined with the first data stream to produce an enhanced decoded data stream.

23. (Previously Presented) The method of claim 22, further comprising performing an error detection function for the data symbol estimates based on the remodulated symbols.

24. (Previously Presented) The method of claim 22, further comprising performing an error detection function for  
the data symbol estimates based on the remodulated symbols,  
deriving correction factors for data symbol estimates detected to be in error, and  
updating LLRs for code bits of data symbol estimates detected to be in error with the correction factors.

25. (Original) The method of claim 20, wherein the LLRs for the code bits of the first and second data streams are derived from the received symbols in real-time without buffering the received symbols.

26. (Original) The method of claim 20, further comprising:  
buffering the LLRs for the code bits of the first and second data streams for subsequent decoding.

27. (Currently Amended) An apparatus for a wireless communication system, comprising:  
a first computation unit operative to derive log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;  
a decision unit operative to derive uncoded data symbol estimates for the first data stream based on the received symbols;  
an interference estimator operative to estimate interference due to the first data stream based on the uncoded data symbol estimates; and  
a second computation unit operative to derive LLRs for code bits of a second data stream based on the received symbols and the estimated interference;  
wherein the second data stream is ~~provided~~ combined with the first data stream to form enhanced data symbol estimates.
28. (Currently Amended) An apparatus for a wireless communication system, comprising:  
a first computation unit operative to derive log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;  
a decision unit operative to derive data symbol estimates for the first data stream based on the received symbols;  
an interference estimator operative to estimate interference due to the first data stream based on the data symbol estimates;  
a decoder operative to decode the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream;  
an encoder and modulator operative to re-encode and remodulate the decoded data to obtain remodulated symbols for the first data stream; and  
an adjustment unit operative to adjust the LLRs for the code bits of a second data stream based on the remodulated symbols and the data symbol estimates for the first data stream;  
wherein information from the adjustment unit is combined with data from the decision unit to form ~~enhanced data symbol estimates~~ of enhancement data symbols.
29. (Previously Presented) The apparatus of claim 28, further comprising:  
a symbol error detector configured to perform an error detection function for the data symbol estimates based on the remodulated symbols.

30. (Previously Presented) The apparatus of claim 28, further comprising:  
a symbol error detector configured to perform an error detection function for the data symbol estimates based on the remodulated symbols, and wherein the adjustment unit is operative to derive correction factors for data symbol estimates detected to be in error.
31. (Currently Amended) An apparatus for a wireless communication system, comprising;  
means for deriving log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;  
means for deriving uncoded data symbol estimates for the first data stream based on the received symbols;  
means for estimating interference due to the first data stream based on the uncoded data symbol estimates; [[and]]  
means for deriving LLRs for code bits of a second data stream based on the received symbols and the estimated interference; and  
means for computing a decoded enhancement stream based on the LLRs for code bits of the second data stream.  
~~wherein information from the LLR deriving means for code bits of the first data stream is combined with information from the LLR deriving means for code bits of the second data stream to form enhanced data symbol estimates.~~
32. (Previously Presented) An apparatus for a wireless communication system of claim 31, comprising:  
means for deriving log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;  
means for deriving data symbol estimates for the first data stream based on the received symbols;  
means for estimating interference due to the first data stream based on the data symbol estimates; and  
means for deriving LLRs for code bits of a second data stream based on the received symbols and the estimated interference;



means for decoding the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream;

means for re-encoding and remodulating the decoded data to obtain remodulated symbols for the first data stream; and

means for adjusting the LLRs for the code bits of the second data stream based on the remodulated symbols and the data symbol estimates for the first data stream.

33. (Previously Presented) The apparatus of claim 32, further comprising error detection means configured to detect errors in the data symbol estimates based on the remodulated symbols, and means for setting LLRs for code bits of data symbol estimates detected to be in error to erasures for decoding.

34. (Previously Presented) The apparatus of claim 32, wherein the means for adjusting the LLRs includes further comprising error detection means configured to detect errors in the data symbol estimates based on the remodulated symbols, means for deriving correction factors for data symbol estimates detected to be in error, and means for updating LLRs for code bits of data symbol estimates detected to be in error with the correction factors.

35-37. (Canceled)